Feeding Livestock During Feed Shortages

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Foreword

When you are faced with a shortage of feed, you often can still maintain your livestock herd. You may have to use feeds you normally don't rely on. You may have to cull. You will have to use rations planned so the nutrients short in one feedstuff are either high in another or added in a supplement.

Whatever strategy you use, saving the herd can keep you in the livestock business. It may also help cushion your finances against income you lose from a poor crop.

This bulletin is intended to provide ideas, suggestions and alternatives which may work in your livestock operation to get you through this feed shortage and help plan for the next one.

This information was prepared by Saskatchewan Agriculture specialists, assisted by University of Saskatchewan animal scientists.

Planning for feeding

Planning for maintaining a livestock herd begins as soon as signs forecast a dry year.

You can graze poor crop stands for feed during the summer. Or, graze fall rye planted the previous year or spring-planted oats.

For fall and winter feed, cut crop stands which will not produce good yields of grain. Harvest them between the heading and soft dough stage.

Harvest all the hay you can from roadsides and sloughs. If your cereal crops have received enough rain, consider using them for hay or silage.

Save straw and chaff for feed. Ammoniation improves digestibility, and increases crude protein in roughages, allowing greater use of straw and chaff in cattle feeding. Look for alternate feeds that may be available such as screenings from grain, canola, lentils, forage seed, etc.

Feed a balanced ration to meet the animals' requirements and make your feed supply as effective as possible. Avoid waste. Watch for health problems.

Periodic feed shortages are a fact of livestock production. Make your operation less vulnerable by planning ahead for next time.

Sheep

Sheep will not eat as wide a variety of roughage or as poor a quality of roughage as will cattle. However, on pasture sheep will consume different feeds readily and, if hungry, may eat poisonous weeds as well.

An ewe needs at least one pound of roughage a day to keep her digestive system functioning normally. Increase this to 1½ pounds (⅔ kilogram) of heavy barley or feed-wheat during early pregnancy and 2½ pounds (one kilogram) during late pregnancy. Conception rates are better and ewes have more lambs if they are gaining weight during the breeding season. So, for flushing on low roughage, give each ewe one pound (½ kilogram) of good, whole grain daily.

As well as roughage, ewes need adequate amounts of vitamins and minerals and a good, clean supply of water.

Breeding eyes may need 10,000 to 15,000 I.U. of vitamin A and 1,000 to 1,500 I.U. of vitamin D per head per day. Pregnant ewes need about 5,000 I.U. of vitamin A and 500 I.U. of vitamin D each, daily. Allow 5 to 10 I.U. of vitamin E for each pound of (½ kilogram) feed for sheep.

The mineral mixture for sheep should supply salt, calcium, phosphorus, iodine and cobalt. Sheep are sensitive to excess copper. Choose a supplement with little if any copper, if you are in an area where the soil has enough copper.

Always make sure sheep have enough water. When they don't have water, they cut down on how much they eat.

Swine

Since swine rations rely on grain, when grain supplies are limited, you as a producer must work out the most economical ration for your animals.

Remember, if you use a ration low in energy, your hogs will gain weight more slowly and be home longer. You will have to watch closely how much less supplement you use so you don't waste grain by feeding longer than is necessary. You will probably still rely on wheat, oats, and barley for rations, although you could use pelleted screenings in some of your rations.

You can use wheat as the major grain in hog rations. If used alone, as finely ground, it does "paste-up" in the mouth. Also, because it is high in energy, limit wheat or the pigs become overfat. So you will probably be better off mixing it with another grain such as oats. Oats are much lower in energy than wheat and need to be supplemented with a feed higher in energy. A 50:50 mixture of wheat and oats is equivalent in feed value to barley.

You can use pelleted screenings as up to 25 per cent of rations for growing pigs. Avoid them in sow rations because they may contain large amounts of unprocessed canola and wild mustard seeds which may cause reproductive problems.

Dairy Cattle

In the long run it is economical to maintain the present size of your cow herd and feed for high production.

Dairy cows need at least 800 pounds (360 kilograms) of hay or its equivalent each month. This amounts to the cow eating about two per cent of her body weight each day as hay. Milking cows need at least 1½ per cent of their body weight as hay daily or they will have digestive upsets and drop milk fat percentage. Also, cows need 350 pounds (158 kilograms) of cereal grain for each 1000 pounds (450 kilograms) of milk they produce.

When good quality hay is in short supply, slough hay, cereal hay and in extreme situations, cereal straw, may be used as a substitute.

Slough hay may be used as the only forage for dairy cattle. When it is the only forage they receive, the cattle will need about an 18 per cent protein dairy concentrate. A less costly ration based on slough hay consists of 6 to 12 pounds (2¾ to 5½ kilograms) of dehydrated alfalfa pellets, sun cured alfalfa pellets or alfalfa cubes and enough slough hay to add up to 25 pounds (11¼ kilograms) of forage a day.

Cereal hay can replace good quality hay entirely. Feed each cow 25 pounds (11¼ kilograms) of cereal hay daily.

When cereal straw has to be used to extend hay supplies, feed only 5 to 10 pounds (2¼ to 4½ kilograms) a day to milking cows. Use hay or a mixture of hay and dehydrated alfalfa to make up the balance of the forage needed.

You can feed replacement heifers and dry cows lower quality forages such as slough hay, grass hay and weedy hay. You will also have to feed them 5 to 10 pounds (2¼ to 4½ kilograms) of grain and supplement.

To be sure you are feeding your dairy herd balanced rations have samples of the feed analyzed for energy, protein, vitamins and minerals. Seek advice on how to combine the feeds so they provide the proportions of nutrients the animals need.

Beef Cattle

Supplementing Pasture with Alternate Grazing

The first problem you usually face in a dry year is lack of pasture. If there is some grass, you can stretch it by feeding grain and hay or straw in the pasture. Barley chop at 5 pounds (2.5 kilograms) per cow daily is like 20 per cent more pasture.

The most important consideration is getting the cows bred so there will be a calf crop next year. Energy is important. So is vitamin A and phosphorus. These are in short supply on dry pasture.

An average milking cow needs about 75,000 I.U. of vitamin A daily either by injection every sixty days or in the grain. Intake of 1:1 calcium:phosphorus mineral should be about 4 ounces (100 grams) per cow daily. Mix with salt or feed with grain to make sure it is consumed.

If there is no grass you should consider sowing cereal crops for use as emergency pasture. Although feed can be purchased and transported to your farm, growing as much of your own as possible is usually the cheaper choice.

Using cereal crops to extend fodder supplies is probably the most economical way of carrying your livestock through a period when pasture conditions are poor.

Oats can provide substantial emergency grazing if it is seeded on summerfallow or on low lying land where moisture is most plentiful. Barley, winter wheat and fall rye can yield as well as, or better than, oats and are also suitable to establish and produce high pasture yields in July but taper off rather quickly in August.

The spring seeded winter cereals are a little slower to establish than spring cereals and produce high pasture yields in July and August. Their yield tapers off in September and October but they do continue to produce low yields during this period as well.

Fall rye can be grazed for a period and still harvested for grain if there is sufficient moisture, according to the Agriculture Canada Research Station at Swift Current. Grazing in the spring reduced yield 10 per cent; fall grazing reduced yield 17 per cent and grazing in fall and spring reduced yield by 25 per cent.

Cereals can be grazed approximately 4 to 6 weeks after seeding, and can be stocked heavily to use all available growth. It is advisable to seed a second field 3 weeks after you seed the first so that when the first one is grazed off, the second will be ready and so on. If drinking water supplies are adequately located this system can provide continuous pasture all summer. If it rains enough later in the summer, the fields your herds grazed early in the season may regrow and produce either additional pasture or hay in the fall.

In times of drought, the previously mentioned cereals usually out yield other annual forages such as millet and sudangrass by a substantial amount.

Other management considerations for coping with inadequate pastures are as follows:

- Confining cattle to a small part of the total pasture area for as long as possible in order to give the remainder of the pasture additional time to grow. The rotational grazing concept will increase forage production in dry years as well as in times of adequate moisture.

- Grazing grass hayland rather than legume forage stands if it becomes necessary to pasture hayland because legumes provide much better second-cut potential than grasses.

- Cutting greenfeed from a portion of cereal crops intended for harvest as grain. Weedy fields would be the most likely candidates.

Creep Feeding and Weaning Early

Creep feeding pays when pasture is poor. Creep feeding takes the pressure off the cows, leaving them as much as 50 pounds heavier in the fall. That's important for winter maintenance. Calves gain efficiently, with feed conversions between 5:1 and 7:1. You will have heavier calves in the fall.

Calves like whole, coarsely cracked or rolled grain. The creep ration should contain 70 per cent TDN (energy) and 12 per cent or more crude protein. Good quality whole oats is favoured by many cattlemen. When pastures are dry, it pays to increase protein in the creep feed. Use a natural protein source (no urea); pelleted so it won't separate. An example creep feed might be 40 per cent rolled barley, 50 per cent whole oats and 10 per cent pelleted canola meal or commercial 32 (0) supplement.

The creep area doesn't have to be elaborate. Fence off an area close to water or salt, preferably with shade. An opening 16 to 18 inches (40 to 45 centimetres) wide and 3 to 3.5 feet (0.9 to 1.1 metres) high will let calves in and keep cows out. The creep feed can be fed in feed bunks, troughs or self feeders.

Start the calves on feed slowly, increase gradually. If too much feed is put out at first, some calves may overeat. Also the leftover feed will get stale and calves may back off. Once calves are used to the creep, don't let it run empty.

Creep feeding works better on smaller pastures than open range with long distances between water holes or salt licks.

Wean the calves as early as possible. Feeding them directly is cheaper than feeding the cows to maintain production plus it allows the cows to pick up condition before winter.

Calves can be weaned as young as 100 days, with no problems, provided they are fed a high quality feed. The feed should contain about 70 per cent TDN, 14 per cent crude protein (no urea), 0.6 per cent calcium and 0.45 per cent phosphorus. Talk to your livestock specialist or feed company.

You may consider the ration more expensive per ton than cow feed. With calf intake about 8 pounds (3.5 kilograms) per day and gain about two pounds (0.9 kilogram) per day, it's low cost gain.

Calves on creep feed for even two or three weeks before weaning, will wean and go on feed much easier. Follow recommended weaning practices to reduce stress on the calf. Where possible "process" the calf three weeks before weaning. Treat weaning as a single stress.

Calves can be weaned at 3 to 4 months if they are given a high quality ration. It is cheaper to feed the calves directly than to feed the cows for milk production.

Winter Feed Supplies

Perennial forages require plentiful moisture by early May to yield well later in the year. You should avoid the temptation of being optimistic and waiting for the first hay growth to develop into a good crop after a dry spring because it won't.

Perennial forages should be cut by the early blossom stages for legumes or early heading stages for grass, **whether there is sufficient yield for hay or not.** That way, if timely rains appear in late June or early July a good second cut can be obtained. If not cut, first growth will simply mature, with little second growth.

Sloughs and roadsides can be cut for hay. Weedy crop areas such as wild oat patches are also good feed and reduce weed infestation next year.

Oats planted after a late rain can still be cut for green feed. The same applies to cereals used for grazing and allowed to re-grow. Sometimes these fields can provide winter feed if there are later rains. Watch for nitrates if there's an early frost.

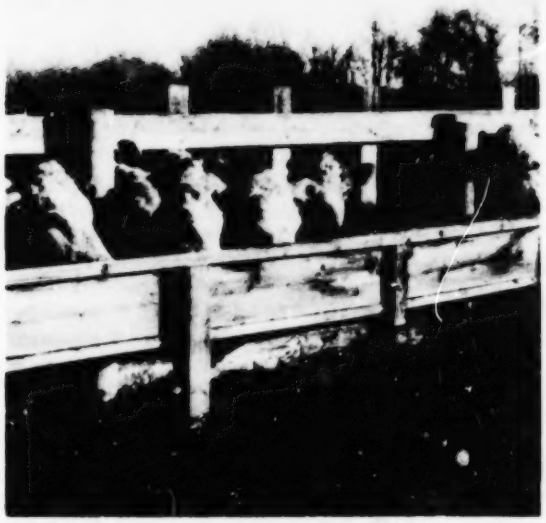
Oats should be cut in the milk stage for best quality. Feed value drops off rapidly as it matures. Barley and wheat can be cut for green feed when slightly more mature.

Livestock producers should also consider trying to save as much **crop residue** as needed during grain harvest to replace any hay production which may have been grazed as emergency pasture.

Chaff can be collected as feed with the advantage of not removing all the plant material from an area, leaving the straw to help hold the soil from erosion. Chaff collection systems are becoming more effective and readily available. Chaff can make up a sizeable portion of the ration for wintering beef cattle or sheep. Chaff fits well into several self feeding systems such as electric wire.

Yield of chaff is not consistent. Wheat crops have more chaff than barley or oats. Short crops and dry conditions produce more chaff as shorter material falls through the straw walkers. Type of combine and combine settings make a difference too.

Chaff from some of the very rough awned bearded wheats such as Pitic-66 may cause palatability problems, especially with younger animals. Chaff from Wascana durum has been fed to young stock with no reported problems.



The better condition cattle are in at the beginning of winter, the better they will tolerate the winter.

Winter Feeding Strategy

You may be faced with feeding less feed or feed of a poorer quality, yet your cattle still need adequate amounts of energy, protein, minerals, vitamins and roughage.

Get a handle on available feed supplies for winter feeding—quality as well as quantity. If there isn't sufficient feed for the numbers of animals you usually overwinter, then you have to decide whether to buy feed or reduce the number of animals overwintered.

Prioritize herd reduction. Top priority should be the pregnant brood cows. If you can get them through the winter with enough body condition after calving to rebreed on schedule, your breeding program won't suffer too badly. That will help you win the war even if you feel you are currently losing the battle.

Pregnancy check the herd in the fall. Cull the opens, cull the bad feet, udders, eyes and personalities. Cull the poor mothers. Here's where good records will help you. You can't always eyeball a loser or remember a problem from last spring.

If there is extra feed after the main herd's needs are met, keep the best replacement heifers. Keep the bred heifers and if there's enough feed keep heifer calves from your best cows. Use your records.

How well cattle tolerate the winter depends on their condition at winter's onset. Thin cattle do not have fat reserves and need as much energy as during any normal winter. They are also more likely to have low vitamin and mineral reserves. Watch them closely for deficiencies, particularly vitamin A deficiency. Separate young and thin cows from the rest of the herd. Feed the young and thin cows extra forage or grain.

Mature cows that finish the grazing season in better than average condition can withstand some feed cutbacks. You can reduce the roughage they receive from the 10 to 20 pounds (4½ to 9 kilograms) you normally would feed daily to a minimum of four to five pounds (1¾ to 2¼ kilograms) daily, along with adequate grain. Greater reductions of forage would interfere with normal rumen function. During the winter feeding these cows can lose weight, up to 120 pounds (55 kilograms). After calving give them extra feed so they nurse properly and return to breeding condition. Larger weight losses may jeopardize their health or cause breeding problems.

If you have to buy feed, decide whether you need hay or can stretch existing roughage with grain or protein supplement. Poor quality roughages if properly supplemented to meet the animals' requirements can replace quality hay in maintaining the pregnant beef cow.

Thin cattle require more feed to keep warm. A thin cow can require 50 to 70 per cent more feed during a cold snap than a cow with some fat cover. That's why it pays to have cows come into winter in good condition—they need less feed.

Don't waste feed. Feeding on the ground can waste up to 50 per cent of poor quality feed. Of all feeding gates tested, home-built "tombstone" type feeders wasted the least feed. If you are feeding with an electric wire keep it adjusted. Moving it a little twice daily is better than once daily and having the animals reach too much feed.

Retain the best quality feed for young stock and nursing cows after calving, because both milk production and growth demand extra nutrients. Allow enough feed for nursing cows to provide twice their precalving energy and protein needs.

Save your best roughage for replacement calves, bred heifers and cows after calving. Both milk production and growth demand extra nutrients.

Ammoniation of chaff and straw increases energy and crude protein content. If allowed free access to treated straw or chaff, cows will eat more than they would untreated. Intake increases from about 12-14 pounds of untreated to 18-22 pounds of treated. Grain required drops from 5-6 pounds per day to about 2 pounds.

Conversely, if grain is fed at 5-6 pounds per head, intake of ammoniated material can be restricted and still maintain the animal in good condition.

Healthy cattle use feed more efficiently. Treat for warbles and lice in the fall. Re-treat for lice in mid winter. Make sure vitamin A, D, and E is adequate either through the feed or injections every 60 days. Balance rations with enough calcium, phosphorus and trace minerals, either mixed with the feed or fed free choice.

Know your feed quality and your animal's requirements. Have your feeds analyzed by Feed Testing Services, University of Saskatchewan. Discuss your situation with your Ag Rep, Livestock Specialist or feed company nutritionist.

Feed all cattle extra in cold weather. A good thumb rule is to increase grain by 2.5 pounds (1 kilogram) for every 10 degrees C drop in temperature to a maximum of 5 pounds (2 kilograms). So if the temperature drops overnight from minus 10 degrees to minus 35 degrees, the cattle need an extra 5 pounds (2 kilograms) of grain to help maintain body temperature.

Feed and Bedding Alternatives

When choosing feed for livestock consider its nutritive value, bulkiness or lack of bulk, presence of other substances and health problems related to its use.

Hay

Dehydrated alfalfa pellets and cubes — Dehydrated alfalfa pellets consist of finely ground artificially dried alfalfa forage in ¼ inch diameter pellets. They can replace up to 14 pounds (6¼ kilograms) of forage in dairy rations. In beef cows' rations about 5 pounds (2¼ kilograms) daily can be used to supplement cereal straw. Alfalfa cubes can be used as the only forage for dairy cattle but fewer problems are encountered when at least 5 pounds (2¼ kilograms) of long hay are also fed. Dehydrated alfalfa pellets may also be used in sheep and swine rations.

Dehydrated pellets can also be used as a protein supplement when fed with low quality roughage.

Slough hay — Slough hay can provide the forage requirements of beef cattle, sheep and dairy replacement animals, if adequately supplemented.

The feed value for slough hay is usually higher than cereal straw and can approach that of brome grass hay. Slough hay is more variable in quality than tame grasses. Generally, fine grasses are higher in value. The coarse material is less digestible and will need supplementation with grain to meet the energy and protein requirements of wintering beef cows. Harvest should occur before killing frost as frozen slough hay will deteriorate quickly and is only about equivalent to cereal straw in value.

Grain crop hay and silage — Cereal hay is suitable to provide the forage component of rations for all classes of beef cattle, sheep and dairy cattle and should be equal in value to good quality brome grass hay.

Wheat, oats, barley, rye, rapeseed and mustard crops can be used for livestock feed. Harvesting should occur between heading and the soft dough stage and should be timed to retain as much leafy material as possible. Rye hay loses palatability and protein content rapidly after flowering. Good quality

cereal hay or silage is about equivalent to brome grass hay in energy and protein content. Oat, mustard and rapeseed crops which have frozen or which have suffered from severe drought prior to harvest should be checked for nitrate content and the ration adjusted if significant amounts of nitrate are present.

Native grass hay — Native grasses, referred to as "prairie wool," are suitable for use in most beef cattle and sheep rations, can be used for replacement dairy cattle and if necessary for milking dairy cattle. These grasses approach brome grass hay in protein and energy content. Stands which are more than one year old can be utilized if available. Care should be taken to avoid cutting while the spears are present on spear grass, generally during July and August.

Roadside hay — Roadside hay primarily consists of grass hay, (bromes, crested wheat) and some clover or alfalfa. When harvesting and feeding it, avoid glass and other foreign material.

Russian thistle — It may be used for hay when other forages are not available. It can make up a significant portion of rations for beef cattle and sheep. Feed it in very limited amounts to dairy cattle. It is usually equal to a fair quality hay in protein content but is lower in TDN. It is a surprisingly palatable feed. Because of its high ash content, it may cause cattle to scour if fed at a high level.

False or Wild Barley (Foxtail) has awns which, if fed in large quantities, can become impacted in the mouths of cattle. Use this forage cautiously. Grinding through a hammer mill may help to break up the awn.

Kochia weed — Kochia weed if harvested before it matures is excellent cattle feed. It is as high or higher in energy and protein as good alfalfa hay. A high mineral content makes it extremely laxative. Kochia weed should not make up more than 25 per cent of the total diet.

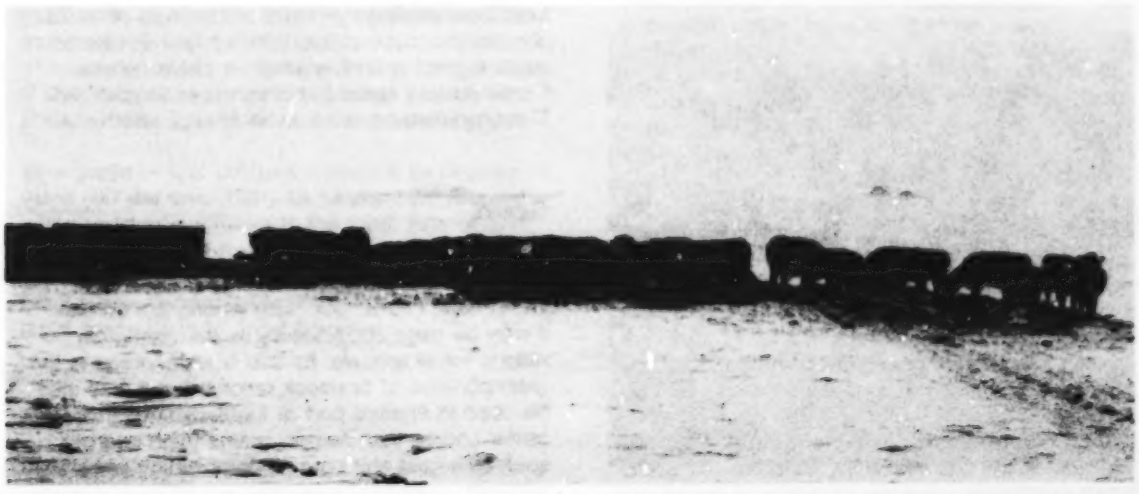
Straw

Fresh cereal straw — Straw is a good alternative in wintering rations for cows and sheep if properly supplemented with an energy source like grain and with added minerals and vitamins. All cereal straws can be fed, with oat and barley straws being preferable because they are more palatable. Straw can be used in combination with other feeds as the sole roughage for beef cows, however, its use should be limited to 8 to 10 pounds (3½ to 4½ kilograms) to maintain milk production in dairy cows.

Old straw — Straw one year old should also be considered a feed source. It usually is slightly more digestible and palatable than fresh straw.

Ammoniated straw and chaff — Ammoniating straw and chaff will improve their feed value and increase consumption. Calculate the cost of ammoniation before treating straw. Ammoniation reduces but does not eliminate the need for grain.

Chaff — Chaff can be used in a similar manner to straw in rations for beef cows and sheep. It contains some grain and weed seeds making it slightly better in feeding value than straw. It, however, still must be supplemented with minerals and vitamins and an energy source such as grain. Producers have successfully left chaff in fields as bunches to be grazed or fed in combination wintering rations.



Feeding on the ground can waste up to 50 per cent of poor quality feed. Using tombstone feeders or electric fences greatly reduces wastage.

Using chaff as feed leaves the straw on the land to prevent erosion.

Flax straw — It is considered to be of lower feeding value than cereal straws. It is coarse and fibrous and as a result, cannot be processed but is readily eaten by cows. If frozen, it should be analysed for prussic acid, which can be poisonous to animals consuming it. Energy and protein must be adequate to guard against rumen impaction.

Protein Supplements

Liquid protein supplements — Liquid protein supplements can be used as part of balanced rations for ruminants. Most of the liquid protein supplements are mixtures based on molasses and contain urea and/or preformed protein, supplemental minerals and vitamins. Read the label carefully to regulate the amounts animals receive or the amounts to be mixed in the grain rations. Most liquid protein supplements are low in calcium and require a calcium supplement to be fed. Do not feed with other feeds containing urea or with ammoniated straw or chaff as toxicity may result. Do not feed straw and liquid protein supplement only. Some grain or quality hay is required to provide sufficient energy.

Canola meal — The meal produced after oil is extracted from low erucic acid, low glucosinolates rapeseed contains about 37 per cent protein and same TDN as oat grain. It can be used as an alternative to soybean meal. If oil meals are used in place of commercial protein supplements, pay special attention to minerals and vitamins in the rations.

During a cold snap, cattle on low quality roughage need extra energy and protein to prevent rumen impaction.

Screenings

Western grain screenings (Pelletized screenings) — These contain mixed grains, wild oats, weed seeds, chaff, hulls and some dust. The contents are finely ground and pelleted. They are similar to light oats in feeding characteristics (11-12 per cent protein and 60-68 per cent TDN). The amount fed to milking cows should not exceed 6-8 pounds (2¾-3½ kilograms) per head daily. They can also be used to supplement roughage (replacing cereal grains) in feeding beef calves and cows and replacement dairy heifers. Because of their fine particle size and the characteristics of some of their ingredients, digestive upsets such as bloat, might occur if they are fed at a high level.

Pelleted flour mill by-products — Pellets containing 15 per cent protein, 3 to 6 per cent fat, 12.5 per cent fiber and 65 to 68 per cent TDN may be available in some areas. They consist of wheat bran, broken kernels and weed seeds, making them comparable in feeding value to oats. They, however, still must be supplemented with minerals and vitamins.

Rapeseed fine screenings — These consist of small or broken rapeseed, chaff and small weed seeds. The composition is about the same as for whole rapeseed. Because the oil content is high, the amount fed should not exceed 10 to 15 per cent of the total ration or there may be an effect on rumen function or on carcass quality.

Rapeseed coarse screenings — They are made up of pods, broken stems and dust particles along with some cereal grain and larger weed seeds. They have about the same feeding value as a medium quality hay.

Lentil screenings — Lentil screenings or lentils rejected because of ascochyta blight discoloration make a good protein source for cattle rations. Crude protein varies between 18 to 24 per cent. They can also be used as an energy source.

Grain

Barley — It is medium in energy (75 per cent TDN) and protein (10-12 per cent) among the cereals. It may be used successfully as the only grain rations for all animals. Its use is widespread in the grain portions of livestock rations, but it may also be used to replace part of the roughage and is a better choice than heavier grains (high energy) such as wheat and corn. A combination of barley with very poor roughage sources will give a feed mixture equivalent of high quality roughage (alfalfa hay, clover hay or brome hay).

Oats — This cereal is the lowest in energy (68 per cent TDN) and compares with barley grain in protein (10-12 per cent). Oats can be used as the only grain in beef cattle and sheep rations except when roughage quality is very low. Oats contain 10-12 per cent fibre and may be used to dilute heavy grains to avoid overfeeding of energy. Oats are the closest to roughages among cereals and make a good roughage replacement.

Barley, oats, wheat and rye are grains commonly used in rations.

Wheat — It is a high energy (80 per cent TDN) high protein (13-15 per cent protein) cereal. It may not be used as the only grain because of some palatability problems at very high levels. It makes an excellent grain ration ingredient when the quality of roughage is low in terms of energy and protein. It should be rolled or coarse-ground except for sheep which can use all cereals as whole grain.

Rye grain — It is similar to wheat in its nutritive value (80 per cent TDN, 13-14 per cent protein) when used at low levels in the feed. Rye should not make up more than 40 per cent of ruminants' grain rations and more than 25 per cent of swine rations due to palatability problems. Also rye is most susceptible to ergot infestion.

Other Feedstuffs

Pea vines — The residue from production of field peas and lentils is a satisfactory feed that is about equivalent to a low quality grass hay in feeding value. The palatability is quite good.

Brewer's mash — This byproduct from malting barley can be used as a feed in either wet or dry form. It is low in energy (61 per cent TDN of dry matter) but high in protein (25 per cent of dry matter). It's an excellent source of B vitamins, but its use for swine may be limited due to its bulkiness in wet form.

Bakery waste — Stale bread and other baking products may be ground and used as a replacement for cereal grains. Because of the fine particle size, it should be mixed with other concentrates and limited to about 10 per cent of the total ration.

Bedding Material

Bullrushes, Willows, buckbrush and other woody material — They are generally not well digested by cattle or sheep. Limited quantities present in hay are not harmful but enough hay should be provided to allow animals to sort out and reject the woody material. They may, however, be used as bedding, if ground.

Grinding Roughages

When hay and straw are scarce, grinding has several advantages. Animals cannot sort as easily and will eat everything, reducing waste. Low quality roughage can be mixed with higher quality in proportions you choose and the cows have to eat it all. Feeds with high nitrate levels can be diluted below the toxic level.

Animals can eat more poor quality roughage if it is ground, and therefore grow faster or maintain themselves easier than on the uncut roughage. However, if energy and protein supplementation is not adequate, rumen impaction can be a very real problem.

There is no point in grinding forage for beef cows if they can get enough to eat without grinding. It increases cost, encourages over consumption and could lead to impaction. Grinding might pay if you were mixing quality feeds and limit feeding to prevent waste.

If hay or straw is tough or damp, power requirements to grind it go way up. The dryer the better. A ½ inch (1.27 centimetre) screen is the best size as there is better intake, less bridging and feed particle separation in complete rations.

Acidulated fatty acid (AFA), tallow, mineral oil, crude vegetable oil, molasses and water have all been used to cut dust problems. If water is used, the cut feed should be consumed within 24-48 hours to prevent heating.

Feed Testing and Ration Design

Nutrient requirements of livestock vary with age, size, level of production and reproduction. Nutrient utilization is most efficient when nutrient supply in the diet is in balance with nutrient requirements of animals.

Feedstuffs vary in their nutrient contents greatly from field to field, year to year, and species to species. The level and type of fertilization, stage of maturity and method of storage and processing, also affect nutrient composition of feeds.

To balance rations you must know exactly what nutrients are present and in what amounts. This information is imperative when roughage mixtures of unknown proportions are harvested and unfamiliar materials are going to be used in feeding livestock. The only accurate method of getting precise information is by laboratory analysis of feed samples.

A full range of feed-testing services is available at the University of Saskatchewan. Feeds can be analyzed for crude protein, estimated digestible energy, essential minerals and vitamins, and for toxic substances such as nitrates and prussic acid. Fees vary depending on the number and kind of analyses and approximate actual costs involved.

The Feed Testing Services also provides a full range of ration balancing and feeding advice based on information provided by the producer. Computerized ration formulations includes "least-costing" whenever possible. This service is included in the cost of the analysis.

If laboratory analyses of feeds and advice on their use are to be meaningful it is essential that samples be properly taken, and that they be accompanied by detailed information about the use to which the feeds will be put. Sampling devices and information sheets are available from agricultural representatives, livestock extension specialists, and other persons involved in servicing the livestock industry.

Examples of Rations for Beef Cattle

All rations suggested assume average values of nutrients. Feed test to be sure.

A. Mature, pregnant beef cows

I. Straw and range pellets

Type of feed	Daily intake lbs.	kg.
straw	free choice (12-14	5½-6¼)
18-20 per cent protein range pellets	5-6	2¼-2¾
blue salt	free choice	

II. Slough hay barley

Type of feed	Daily intake lbs.	kg.
medium quality slough hay	15-16	7-7¼
ground barley	3	1¼
vitamin A	40,000 I.U.	
2:1 mineral supplement	free choice	
blue salt	free choice	

III. Ammoniated Chaff – free choice

Type of feed	Daily intake lbs.	kg.
ammoniated chaff	18	8
ground barley	2	1
2:1 mineral, blue salt	free choice	
vitamin A	40,000 I.U.	

IV. Straw – alfalfa pellets – barley

Type of feed	Daily intake lbs.	kg.
straw	12-14	5½-6¼
alfalfa pellets	2	1
ground barley	5	2¼
vitamin A	40,000 I.U.	
2:1 mineral supplement	free choice	
blue salt	free choice	

V. Cereal hay

Type of feed	Daily intake lbs.	kg.
cereal hay	20	9
2:1 mineral supplement	free choice	
vitamin A	40,000 I.U.	
blue salt	free choice	

VI. Ammoniated Chaff – limit fed.

Type of feed	Daily intake lbs.	kg.
ammoniated chaff	11	5
ground barley	7	3
2:1 mineral, blue salt	free choice	
vitamin A	40,000 I.U.	

B. Nursing beef cows

I. Cereal hay – ground barley

Type of feed	Daily intake lbs.	kg.
cereal hay	20	9
ground barley	4	1¾
vitamin A	60,000 I.U.	
2:1 mineral supplement	free choice	
blue salt	free choice	

II. Slough hay – ground barley

Type of feed	Daily intake lbs.	kg.
medium quality slough hay	15-18	7-8
ground barley	8-9	3½-4
vitamin A	60,000 I.U.	
2:1 mineral supplement	free choice	
blue salt	free choice	

III. Ammoniated chaff – alfalfa pellets – ground barley

Type of feed	Daily intake lbs.	kg.
ammoniated chaff	15	6.8
alfalfa pellets	7	3.2
ground barley	10	4.5
1:1 mineral (salt free)	4 oz.	100 g
blue salt	free choice	
vitamin A	75,000 I.U.	daily

C. Growing beef 500-700 lbs., gain 1½ lbs. per day

I. Slough hay – beef supplement – barley

Type of feed	Daily intake lbs.	kg.
slough hay	6-7	2¾-3¼
32 per cent beef supplement	1	½
ground barley	6-7	2¾-3¼
vitamin A	20,000 I.U.	
2:1 mineral supplement	free choice	
blue salt	free choice	

II. Cereal straw – range pellets

Type of feed	Daily intake lbs.	kg.
cereal straw	6	2¾
18-20 per cent protein range pellets	9	4
blue salt	free choice	

III. Ammoniated chaff – lentil screenings – barley

Type of feed	Daily intake lbs.	kg.
ammoniated chaff	9	4
lentil screenings	2.5	1
ground barley	4.5	2
2:1 mineral, blue salt	2-4 oz.	50-100 g
vitamin A	25,000 I.U.	

Health Problems

Ration changes — Animals need time to adapt to changes in feed. Ruminants especially need to gradually switch from high roughage rations to high grain rations. Rapid changes may cause acidosis, or other digestive upsets in cattle or sheep.

Feeding hay to cattle and sheep before allowing them to graze green crops or lush pastures can prevent some of the digestive problems. Or, you might allow the animals to graze only a few hours a day until they have adapted to the new feed.

Some animals may develop allergic reactions to substances in fresh, lush, green feeds.

Mold and ergot — Mold toxins or ergot can cause poisoning in animals. Swine and pregnant animals are most susceptible to these toxins. These toxins, if consumed at high levels, may cause abortion, vaginal or rectal prolapse, internal bleeding or dry gangrene-like symptoms and, even, death. Weak and starving animals are less able to detoxify these toxins. Addition of vitamin, A, D, and E may help the animals tolerate these toxins. Diluting the moldy feed with clean feed may bring the toxin concentration down to a safe level. Dilute ergoty feeds to less than one ergot body per 1000 kernels.

Rumen impaction — Feeding excessive levels of low quality hay or straw to cattle without adequate grain supplementation to provide energy and protein can leave the forage undigested and cause rumen impaction. Lack of water may also contribute. Hammering low quality forage can increase the amount of forage eaten but may also lead to impaction if the ration is low in energy and protein content. You must be particularly watchful to ensure adequate energy intake during periods of severe cold.

Problems due to water — While producers have successfully used clean snow as the winter water source for beef cows and sheep, this practice must be used with extreme care as lack of water can lead to rumen impaction or reduced feed intake.

If you are concerned about the quality of water for your livestock or have noticed your animals are eating less or drinking less or your animals have scours, you should have a water analysis carried out to determine the level of minerals present in it.

Pesticides and herbicides — If you intend to salvage cereal crops for feed, ask about pesticide and herbicide applications to make sure restrictions listed have been complied with. Never feed seed grain treated with chemicals.

Awns from wild barley or "foxtail" can lodge in an animal's mouth, sometimes causing an abscess. Hay with a lot of "foxtail" is unpalatable and should be avoided.

Dicoumarol Poisoning or "Sweetclover Disease" — Moldy sweetclover hay or silage may contain dicoumarol. This agent prevents blood from clotting, so animals may bleed to death internally or from external wounds. One thumb rule for safe feeding is: 3 weeks on sweetclover and 3 weeks on another feed. New low-coumarin varieties of sweetclover such as Polara do not become toxic with molding.

Nitrate Poisoning — Frost, drought and weed sprays may be factors in high nitrate accumulation by plants. Oat straw and oat hay are most affected. Green oats should be cut either immediately after a frost before nitrates build up or after 14 days with no frost to allow the nitrate built up to be cleared by the plant's system. Green feed cut after a frost should be tested for nitrates. Agricultural Representatives can do a quick spot test for presence of nitrates. If nitrates are present, the amount should be determined by the Feed Testing Services, University of Saskatchewan.

The thumb rule for feeding is to dilute the nitrate-containing roughage with nitrate-free roughage so the total feed contains no more than 0.5 per cent nitrate. For example if green oats has 1.0 per cent nitrate it should be diluted half-and-half with nitrate-free roughage. This should be done with each feeding to prevent over consumption by any individual animal. It does not work if high-nitrate feed is fed one day and nitrate-free feed the next.

Forages containing nitrates may cause death to cattle and sheep by interfering with oxygen transport by the blood. Symptoms of nitrate poisoning include rapid breathing and pulse as the animal

strives for oxygen, frothing from the mouth, blue color of the mucous membranes, muzzle and udder and brown colored blood. Treatment requires early intravenous injection of a 40 per cent solution of methylene blue at the rate of 100 cc per 100 pounds (45 kilograms) body weight.

Prussic Acid (Hydrocyanic Acid) Poisoning — Flax that has been frozen or severely affected by drought may contain toxic quantities of prussic acid (0.03-0.04 per cent). Symptoms of prussic acid poisoning are similar to nitrate poisoning except blood remains bright red. Death usually occurs before treatment is possible, although early intravenous injection of sodium nitrate and sodium thiosulfate by a veterinarian may be beneficial. Where prussic acid may be a problem, feed should be analyzed by the Feed Testing Services, University of Saskatchewan and suitable precautions taken. Prussic acid in cured forage gradually disappears and is seldom a problem in the winter.

Nutritional deficiency diseases — Poor quality feeds supply fibre to the animals, but are low in energy, protein, minerals and vitamins. Inadequate amounts of nutrients may lower conception rate, disease and parasite resistance, and may result in weak calves and lambs and sometimes still-born offspring.

When low quality forages are fed, you must provide mineral and vitamin supplements. Pay particular attention to supplying adequate vitamin A and supplying minerals free-choice or force feeding.

It bears repeating, know the quality of your feeds and your animals' requirements. Avoid wasting feed or underfeeding by having your feed analysed. Contact Saskatchewan Feed Testing Services or talk to your Ag Rep, Livestock Specialist or feed company nutritionist about the best rations for your cattle.

The following disease conditions pose higher risks during very dry periods.

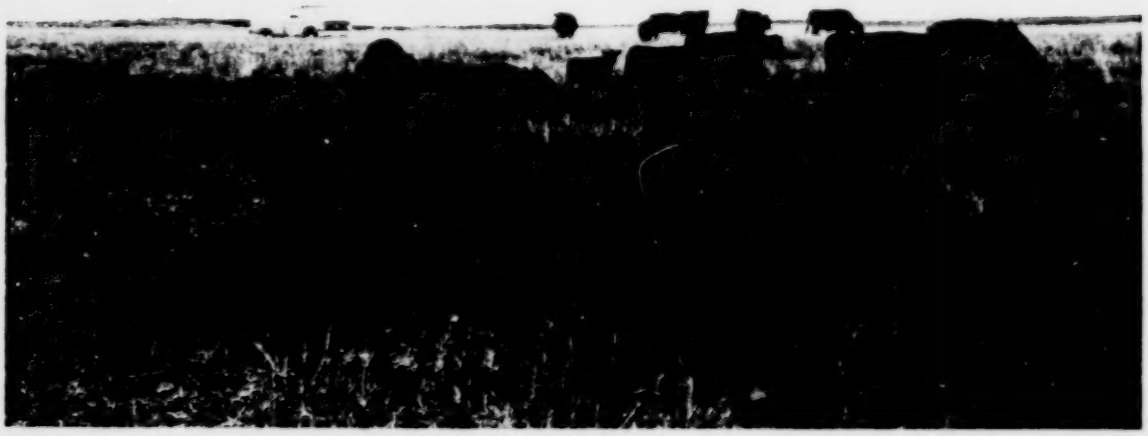
Pneumonia — Severe blowing dust can irritate the respiratory tract of cattle and cause an increase in cases of pneumonia.

Poisonous Plants — Poor pasture conditions increase the risk of plant poisoning. A good many poisonous plants are rather unpalatable but when grass is short cattle will eat such things as chokecherry leaves, marsh arrow grass, etc. which can result in poisoning.

Blackleg — Soil borne diseases such as Blackleg present a higher risk because cattle are grazing close to ground level.

Grass Tetany/AIP — Severe drought followed by heavy rain may result in rapid, lush growth of cereals and/or seeded pasture. This has the potential of causing grass tetany, a disease somewhat similar to milk fever and a form of pneumonia variously called AIP (atypical interstitial pneumonia), pulmonary emphysema, fog fever, etc. The major symptom of this form of pneumonia is labored breathing.

The local practicing veterinarian can provide additional information regarding these and other potential disease conditions.



Hungry cattle should be fed before being turned into new pasture. They may eat poisonous plants because they won't selective graze at first. They should be watched carefully the first few days for digestive upsets or AIP (change of pasture pneumonia).

Ammoniation of Straw and Chaff*

It is recommended to leave the straw on the land especially in the brown and dark brown soil zones, and collect chaff for feed. Straw left on the land preserves soil tilth and helps prevent erosion. When a producer is faced with a feed shortage, he must decide whether to remove the straw for feed or look for more feed elsewhere.

Ammoniation is a method of treating low-quality hay and crop residues such as straw and chaff to improve their nutrition value as feeds for ruminant animals. The method involves sealing the residue or hay in a gas-tight enclosure and adding anhydrous liquid ammonia supplied by fertilizer dealers. After 21 days, the chemical reaction is complete.

Ammoniation improves feeding quality by increasing the amount of digestible energy (TDN) in the residue, the amount of roughage the animal will consume, and the crude protein equivalent (CP).

No problems have been reported with the feeding of ammoniated feeds. No abortions, significantly lightweight calves or reproductive problems have been associated with ammoniation. No incidents of impaction should occur provided the total energy intake is adequate. **Ammoniation of straw or chaff reduces grain requirements but does not eliminate it.**

Chaff fits into self-feeding systems for calves as well as cows.

Sampling prior to ammoniation — Straw or chaff intended for ammoniation should contain at least 12 per cent moisture, preferably 15 to 20 per cent. The feeding quality of straw or chaff should be as follows: wheat straw should have a TDN of at least 33 per cent and barley straw a TDN of at least 38 per cent.

To assure that the moisture content and feeding quality of your straw or chaff are adequate for ammoniation, submit a representative sample to Feed Testing Services, University of Saskatchewan, for analysis.

Combine small amounts of straw taken from different parts of the field or the stack so the analysis will truly represent your material. Your agricultural representative and livestock specialist have the equipment required to sample your residue properly.

When to Ammoniate — A minimum moisture level of 12 per cent is necessary for efficient ammoniation. This can be achieved by baling early in the morning after a heavy dew or by baling as soon as possible after a rainfall.

Usually chaff collected from combining a swathed cereal crop is very dry, containing 8-10 per cent moisture. The moisture content must be increased to 15-20 per cent, or a satisfactory improvement in digestibility may not be obtained. This can easily be accomplished by attaching a 15-20 foot (4.5-6 metre), ½ inch (1.27 centimetre) copper pipe to a garden hose, perforating the final three feet of the pipe and calibrating it for water delivery. This pipe can be inserted and withdrawn throughout the stack until the right amount of water has been added.

Let's say you want to increase the moisture content of a chaff stack by 5 per cent. If the stack contains 40 tons of chaff you need 400 gallons of water. (40×2000×.05/10) or (40 tonnes×1000 kg×.05 = 2000 litres.)

If so many gallons (litres) per minute run through the copper pipe, you just put the pipe into different places in the stack for the total required number of minutes.

The efficiency of ammoniation is also dependent on temperature: the higher the temperature, the better the result. Generally, it is advisable to ammoniate early in the fall, before temperatures become too cold.

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*This information is condensed and adapted from "Ammoniation of Straw and Chaff" by Dr. Jack Kernan and Dr. Jerry Knipfel; University of Saskatchewan publication no. 453. For more complete information, including illustrations, pick up a copy from your Ag Rep.

Location of the Stacks — Each stack should be: a) downwind and some distance from the farm buildings and cattle holding area; b) accessible to farm machinery from all sides; c) accessible at both ends so that the ammoniation pipes may be inserted; d) placed near some shelter which will reduce or prevent wind damage.

Building the Stacks or Piling Chopped Straw or Chaff — The dimensions of the stack or piles are determined by the size of the plastic sheet to be used to cover them. Six mil, black polyethylene is available in sheets 100 feet long by 40 feet (30.5 metres×12.2 metres) wide. The stacks or piles must be constructed in such a way that an overhang of at least 2 feet (0.6 metres) of plastic is left on each side and at each end to seal the enclosure properly.

The plastic cover is particularly susceptible to damage from the corner bales of stacks constructed from rectangular bales. To protect the plastic, cover the corner bales with grain bags or plastic fertilizer bags. It is also wise to cover the whole stack with a used plastic underlay.

Depending on the size of the bales and the plastic, round bales can be stacked in up to 15 rows of a 3:2, 3:2:1 or a 4:3 arrangement. A bale should be unrolled along the top of the 3:2 and 4:3 arrangements to improve drainage.

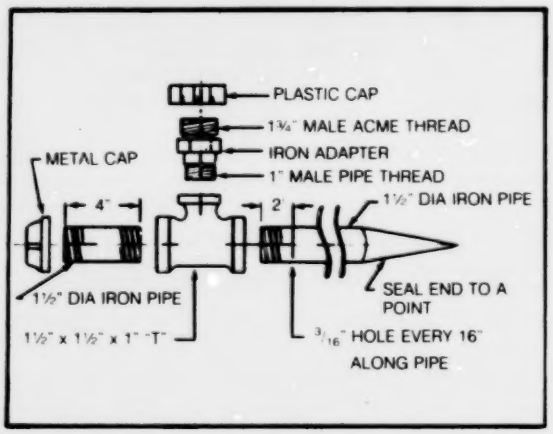
Straw chopped 1 inch long or chaff can be piled on the ground, shaped, and covered with a sheet of plastic. Such a pile can contain 42 tons (38 tonnes) of chopped straw or from 50 to 75 tons (45 to 68 tonnes) of chaff.

Covering the Stacks — The stack can be covered in two ways. For large stacks of rectangular bales, it may be advisable to hoist the roll onto the stack, unroll the plastic along the top of the stack, and unfold it down the sides.

The other method is to open the plastic on the ground and drag it over the stack. The latter method is best for stacks of round bales or piles of chopped straw or chaff. If you choose a day with no more than a light breeze blowing, a stack can be covered by three to five people in one hour. You should acquire all necessary materials and wait for a suitable day, rather than try to battle any appreciable amount of wind.

When the plastic has been positioned over the stack, place dirt or sandbags along one side. A small amount of dirt or a few sandbags are placed on the other side and rolled toward the stack by lifting up the edge of the plastic. This tightens the plastic snugly around the snack. The corners are then pulled out as if you were wrapping a Christmas parcel and folded across the end of the stack. The entire cover should be well sealed at the base of the stack.

Finally, all edges should be taped down (make sure that all loose edges are well sealed) and the stack should be covered with a fish net or camouflage net to reduce wind damage. The net can be tied to square bales or old tires to keep it in place.



Iron pipes about 22 feet (7 metres) long are sealed to a point at one end and threaded at the other.

Preparing and Inserting Ammoniation Pipes — Use only iron pipes for adding ammonia to the straw or chaff. Iron pipes, about 22 feet (7 metres) long and 1½ inches (3.8 centimetres) in diameter are sealed to a point at one end and threaded on the other. A 1½-inch by 1½-inch by 1-inch (3.8 centimetre×3.8 centimetre×2.5 centimetre) "T" containing a 4-inch (10 centimetre) length of 1½ inch (3.8 centimetre) pipe, threaded on both ends and capped, is screwed onto the end of the pipe. An iron adapter with a 1-inch (2.5 centimetre) male pipe thread on one end and a 1¾-inch (4.5 centimetre) male acme on the other is screwed into the "T" and fitted with a plastic cap. The 1¾-inch (4.5 centimetre) male acme will fit the valve on the ammonia hose. Beginning about 2 feet (0.5 metres) from the "T", drill 3/16-inch (0.5 centimetre) holes every 16 inches (40 centimetres) along the length of the pipe on the side opposite the adapter.

The pipe is pushed into the stack with a tractor and adjusted so the holes point down, enabling the pipe to drain free of liquid ammonia. Insert the pipe until it is just past the hole nearest the "T".

Pipes should be inserted into both ends of bale stacks over 40 feet (12 metres) and half the ammonia added through each pipe. Because chaff piles are much denser, insert pipes every 10-12 feet (3-4 metres) down the side of the chaff pile and add a portion of ammonia in each place.

A plastic sleeve, available from Saskatchewan Research Council, helps seal the plastic cover around the pipe in straw stacks but is unnecessary in a chaff pile.

Determining How Much Ammonia To Add — Add 3.5 per cent anhydrous ammonia based on the dry matter content of the stack or if the stack contains 15 per cent moisture, you can add 3 per cent anhydrous ammonia based on the actual weight of the stack.

Example:
40 tons @ 15 per cent moisture×2000 lbs.×3 per cent=2400 lbs. or 375 gal. of NH_3
(40 tonnes @ 15 per cent moisture×1000 kg×3 per cent = 1200 kg or 1880 litres of NH_3.)

Adding the Ammonia — Pressurized, liquid, anhydrous ammonia is very hazardous. This operation should therefore be carried out by an experienced ammonia dealer. Before the ammonia is added, uncover a 3-foot (1 metre) length of the plastic along the base of the stack, half way down one side. This allows air to escape from the enclosure as the ammonia evaporates. The opening must be resealed after the addition or during the addition of ammonia if an excessive amount of ammonia begins to escape.

To assure that you do not over- or under-ammoniate your straw, **add the ammonia through a metered pump,** not from a nurse tank.

Removing the Ammoniation Pipes — About 20 to 30 minutes after all the ammonia has been added, the pipes can be withdrawn from the stack. Care must be taken to support each pipe as it emerges or it can damage the plastic cover. **If it is necessary for you to hold the pipe, you must wear goggles and insulated rubber gloves for protection against any residual ammonia left in the pipe.** The hole in the plastic cover should be sealed with 2-inch (5 centimetre) plastic tape.

Uncovering Stacks of Ammoniated Straw — The ammoniation process is complete in about 21 days. Leave the stack covered until a few days before the ammoniated straw is required for feed. **In opening the stack, be careful to avoid exposure to ammonia gas still present.**

Open the stack on a day when there is a light breeze blowing away from buildings or corrals. If the plastic is not frozen in, remove it carefully and you should be able to use it again as a cover with only minor repairs.

After the cover is removed, leave the stack for a few days to allow all the excess ammonia to evaporate; animals will not consume feed with a strong odor of ammonia present. They may take a couple days to get used to the smell.

Several Saskatchewan producers have had good success feeding ammoniated chaff stacked between two fences. When feed was required, the plastic was removed and electric wires placed at each end of the stack to control the animals.

Warning: Do not feed supplements containing urea with ammoniated residues. The combination may be toxic to animals.

Cost of Ammoniation — The cost of treating straw with ammonia is of course, dependent on the cost of materials.

If materials are purchased at good prices and a large stack is treated, your out-of-pocket costs for ammoniation (ammonia plus materials) could be around $20.00 per ton (tonne) or less.

Safety Considerations — Be sure to observe all safety precautions noted.

Anhydrous ammonia is very toxic to the skin and eyes. If you should come into contact with anhydrous ammonia, flush it away immediately with water or serious injury will result. Liquid anhydrous ammonia evaporates, forming a gas with a pungent and disagreeable odor. Avoid exposure to the gas.

Mixtures of 16 to 27 per cent ammonia in air can be flammable and even explosive. As a safety precaution, never smoke or light a flame near ammonia.

Things to Think About — The sooner a producer decides to ammoniate chaff or straw, the sooner he can acquire the necessary material and make arrangements for the treatment. The earlier the treatment can be conducted in the fall, the better the results will be, since there is a better chance of having a higher ambient temperature. The chance of getting the ammonia delivery when required will also be much better if it is done before the fertilizing season begins.

Persons who intend to ammoniate straw or chaff are strongly advised to contact their agricultural representative or livestock specialist for assistance.

Planning For The Next Feed Shortage

If periodic drought and feed shortages are part of the livestock scene in Saskatchewan, then the time to start planning for the next dry period is when the last one is over. There are three main areas you could look at to make your operation a little more drought proof.

Pasture Management — Use seeded pasture to compliment native range. In 1980 Swift Current Research Station ran 60 cows with calves on three quarters of pasture: 60 per cent native, 40 per cent seeded. The seeded pasture was in three fields: crested wheat, Russian and Altai wild rye cross seeded to alfalfa.

The cattle were rotated from one field to the next. The cows got 34 days grazing on the native grass and 124 days on the seeded grass. The seeded grass responded whenever there was a little rain with some re-growth.

Seeded forages will respond faster, with less rain than native range. Having part of your pasture seeded to tame grass legume mixtures pays off in dry years.

Leave some carryover on the native range. Range with 40-50 per cent carry over will in the long run produce more grass and more beef per acre than pasture that is grazed down. The carryover maintains the higher yielding species in the stand and leaves the roots in better condition. The carryover also traps whatever snow there may be.

Graze according to the grasses' production calendar. Seeded grasses grow early in the spring and do most of their growth in the first 6 weeks. The Russian and Altai wild rye grasses hold their feed value into the fall. Native pasture does most of its growing in late June and July. Grazing before late June reduces the total yield and increases the number of acres required to carry a cow.

Yielding to the temptation of leaving the cows out on pasture during an open winter all too often results in no grass left in the pasture should spring rains fail.

Fence and water — One of the major problems in using annual cereals for emergency pasture can be lack of fence and water. If your farm has fields that are regularly seeded to fall rye, for example, consider fencing them and developing a water supply—such as a dugout in a low spot "just in case." Take a look at the new high tensile fencing systems that can cut fence costs by 40 to 60 per cent. Talk to your Farmstead Engineer about fences and water development.

Fenced fields with water become your emergency pasture and can be used in normal years for fall grazing of crop aftermath.

Feed supply — Extra feed supplies pay off in spades if you suddenly have to feed the cows for a few extra weeks in the spring or can't grow enough feed for next winter. Putting up extra in the good years to use when times are tough is a practice that has never gone out of style on a lot of cattle operations. Hay shelters prevent storage losses. Silage pits have been opened after 10 to 20 years with the feed still in good condition.

Look at developing small irrigated hayland in areas where that is feasible. Forty acres (16 hectares) of hay that is not dependent on the weather is like money in the bank.

If you have a neighbour with saline land or low areas, work out a deal with him. If he'll seed it to forage you'll buy that hay. This arrangement has been very successful in a number of instances, expanding and stabilizing the feed base for the cattleman and providing income and soil improvement for the grainman.

Resources for More Information

For more information on animal nutrition, range management, alternate forages, fences, facilities and water development, contact the following specialists, agricultural representatives, regional livestock specialists, regional soils and crops specialists, regional dairy specialists or regional farmstead engineers or obtain a copy of the following publications:

Specialists

Dr. A. Hamid Javed
Provincial Ruminant Nutritionist and Sheep Specialist
3130–8th Street East
SASKATOON, Saskatchewan S7H 0W2
664-5088

Allen R. Hingston
Provincial Beef Cattle Specialist
3085 Albert Street
REGINA, Saskatchewan S4S 0B1
565-4694

Vernon Racz
Provincial Swine Specialist
3130–8th Street East
SASKATOON, Saskatchewan S7H 0W2
664-5099

Howard Bjorge
Forage Crops Specialists
3085 Albert Street
REGINA, Saskatchewan S4S 0B1
565-4674

Ted Padbury
Livestock Facilities Specialist
3085 Albert Street
REGINA, Saskatchewan S4S 0B1
565-6591

Saskatchewan Feed Testing Service
General Purpose Building
University of Saskatchewan
SASKATOON, Saskatchewan S7H 0W0
343-5697

Department of Animal and Poultry Science
University of Saskatchewan
SASKATOON, Saskatchewan S7N 0W0
343-2666

Agriculture Canada Research Station
Swift Current 773-4621
Melfort 752-2776

Publications

1) Ammoniation of Straw and Chaff
University of Saskatchewan publication #453

2) Beef Cattle Feeding Systems
Saskatchewan Agriculture publication

3) Chaff Systems
Saskatchewan Agriculture publication

4) Farm Pasture Fencing
Saskatchewan Agriculture publication

5) Feeding Beef Cows and Heifers
Agriculture Canada publication #1670E

6) Feedlot Finishing of Cattle
Agriculture Canada publication #1591

7) Finishing Cattle on the Family Farm
Saskatchewan Agriculture publication

8) Forage Harvesting Methods
Saskatchewan Agriculture publication

9) Management of Prairie Rangeland
Agriculture Canada publication #1589

10) Problem Feeds for Livestock and Poultry
Agriculture Canada publication #1701

11) Stock Poisoning Plants of Western Canada
Agriculture Canada publication #1361

Saskatchewan Agriculture

Animal Industry Branch

For more information contact:

Walter Scott Building
132 3085 Albert Street
Regina, Saskatchewan
S4S 0B1

(306) 565-4675

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